EXPERIMENTAL MODELLING OF A PARACHUTE-TYPE TIDAL ENERGY CONVERTER

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Riggers UK is a Cornish service provider founded in 1970, providing diagnosis, advice and assistance on all aspects of yacht rigging, masts and commercial rigging. As a side-line activity, Riggers UK has started to develop the concept of an innovative device, shown in Figure 1, able to extract energy from water streams. The device consists of a series of semi spherical membranes ("chutes") connected by means of a rope passing through their centre. The rope, pulled by the drag due to the action of water flow on the chutes, is then allowed to turn around a couple of rotors. These, in turn, are connected to a power take-off system (e.g. a permanent magnet generator) which converts the rotation of the rotors into electricity.

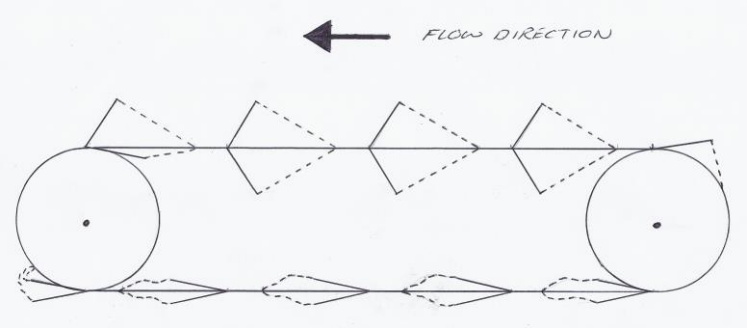

Figure 1. Simplified representation of Riggers UK device.

Within the European funded programme Marine-i, the University of Exeter undertook a series of experimental tests, according to the ITTC guidelines [1], of a scaled and simplified versions of the device in the flume available at Penryn campus. These tests were made in order to verify the working principle of the prototype, compare the outcomes with previous numerical estimation and obtain indications for the optimization of the device. Different configurations in terms of chute size, distance and angle were conducted in order to maximize the drag of the device. The main results and their significance, especially in terms of future development of the device, will be presented.

REFERENCES

[1] ITTC – Recommended Procedures and Guidelines, Resistance test. Available at: https://ittc.info/media/1575/75-02-02-01.pdf